

We will algebraically find a candidate for the period of the tangent function, defined by  $\tan(x) = \frac{\sin(x)}{\cos(x)}$ .

**Exercise 1** Using the angle sum identity, we know that for any real number  $x$ ,

$$\sin(x + \pi) = \sin(x) \cos(\boxed{\pi}) + \cos(x) \sin(\boxed{\pi})$$

and

$$\cos(x + \pi) = \cos(x) \cos(\boxed{\pi}) - \sin(x) \sin(\boxed{\pi}).$$

**Exercise 1.1** Using knowledge of famous angles, we can simplify the following expressions as follows:

$$\sin(x) \cos(\pi) + \cos(x) \sin(\pi) = \boxed{-\sin(x)}$$

and

$$\cos(x) \cos(\pi) - \sin(x) \sin(\pi) = \boxed{-\cos(x)}$$

**Exercise 1.1.1** Using the information found above,  $\tan(x + \pi) = \boxed{\tan(x)}$ .

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